PB83-200618

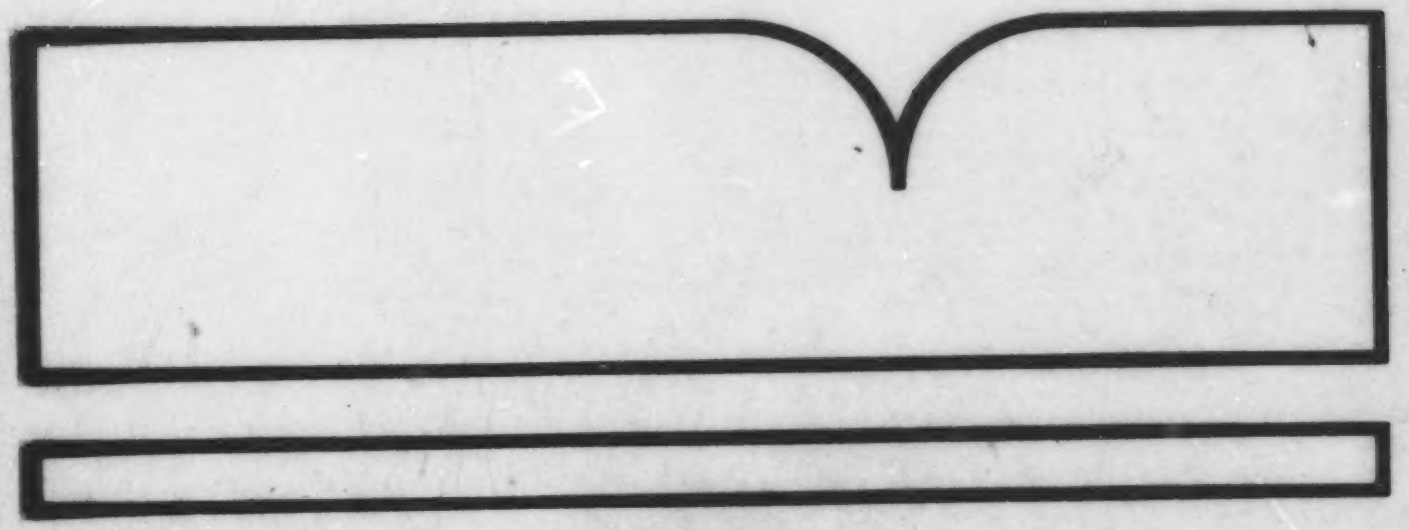
Survey of Industrial Applications of Vapor-Phase Activated-Carbon Adsorption for Control of Pollutant Compounds from Manufacture of Organic Compounds

IT Enviroscience, Inc.
Knoxville, TN

Prepared for

Industrial Environmental Research Lab.
Cincinnati, OH

Apr 83



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EPA-600/2-83-035
April 1983

SURVEY OF INDUSTRIAL APPLICATIONS OF VAPOR-PHASE ACTIVATED-CARBON ADSORPTION FOR CONTROL OF POLLUTANT COMPOUNDS FROM MANUFACTURE OF ORGANIC COMPOUNDS

by

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Contract No. 68-03-2568
Task No. T7009

Project Officer

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PAGE NUMBER
EPA-287 (Cin.)
(4-76)

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA-600/2-83-035		PB83 200618

4. TITLE AND SUBTITLE	5. REPORT DATE
Survey of Industrial Applications of Vapor-Phase Activated-Carbon Adsorption for Control of Pollutant Compounds from Manufacture of Organic Compounds	April 1983
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
F. D. Hobbs, C. S. Parmele, D. A. Barton	
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
IT ENVIROSCIENCE, INC. 9041 Executive Park Drive Knoxville, TN 37923	CO6A1B
	11. CONTRACT/GRANT NO.
	68-03-2568 (T-7009)
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
INDUSTRIAL ENVIRONMENTAL RESEARCH LABORATORY OFFICE OF RESEARCH AND DEVELOPMENT U. S. ENVIRONMENTAL PROTECTION AGENCY CINCINNATI, OH 45268	Final (4/79 - 3/80)
	14. SPONSORING AGENCY CODE
	EPA/600/12

15. SUPPLEMENTARY NOTES

A Survey of Aqueous-Phase Activated Carbon Applications is Covered in a Separate Report

16. ABSTRACT

This study covers industrial use of activated carbon for vapor-phase applications. A listing of over 700 applications of vapor-phase carbon systems is made available for use in identifying sites where a given compound is being removed.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Industrial waste treatment	Air Pollution Control	13B
Organic compounds	Vapor-phase adsorption	68A
Hydrocarbons	Wastewater Treatment	
	Carbon adsorption	

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release to Public	Unclassified	53
	20. SECURITY CLASS (This page) Unclassified	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

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FOREWORD

When energy and material resources are extracted, processed, converted, and used, the related pollutional impacts on our environment and even on our health often require that new and increasingly more efficient pollution control methods be used. The Industrial Environmental Research Laboratory - Cincinnati (IERL-Ci) assists in developing and demonstrating new and improved methodologies that will meet these needs both efficiently and economically.

The objective of this study was to gather performance data on the current uses of activated carbon for treating both industrial wastewaters and vapor emissions from the manufacture and use of organic chemicals. This information is contained in two reports: one dealing with aqueous-phase applications and one with vapor-phase applications. Much of the basic information about carbon adsorption has appeared elsewhere in a variety of sources; these reports serve the purpose of bringing together the information in a single source. The data compiled by this survey can also be used to identify sites for sampling.

For further information on this subject, contact the Industrial Environmental Research Laboratory, Cincinnati, Ohio 45268

David G. Stephan
Director
Industrial Environmental Research Laboratory
Cincinnati, Ohio

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ABSTRACT

Vapor-phase activated-carbon adsorption has frequently been used to recover solvents and/or control emissions from processes that manufacture or use organic chemicals. This report presents the results of a survey of the applications of vapor-phase adsorption. A separate report on the survey of aqueous-phase applications of activated carbon was prepared concurrently.

Use of adsorption is not restricted to the synthetic organic chemicals manufacturers. Nearly 760 applications of vapor-phase adsorption were found by reviewing state and EPA files, the open literature, government reports, vendor literature and information from companies that manufacture or use organic chemicals. Although a wide variety of applications were found, the data base that would allow assessment of the effectiveness and cost of this technology is very incomplete. There are probably many applications that were not identified by this survey because there is evidence that most of the data bases that were searched are incomplete. The shortcomings of the data bases are also illustrated by the fact that data for both the flowrate and the compounds being adsorbed were available for only 25% of the applications.

A limited amount of followup showed that a significant amount of effort would be required to fill the gaps in the data base. This report summarizes the information collected, the references used and contacts made to gather these data in order to facilitate any followup activities that may be done in the future.

Even though this survey did not produce an exhaustive compilation of cost and performance data for full-scale applications of adsorption, no sources of data contained a more complete listing of applications than the one found in this report.

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APPENDIX

A. SUMMARY OF CONTACTS MADE

I. INTRODUCTION

The effluent guidelines which are to be promulgated by the EPA are to also identify Best Available Treatment for the priority pollutants. Activated carbon adsorption is the wastewater treatment technology most often identified as being capable of achieving the low effluent concentrations being considered. Similarly, vapor-phase activated-carbon adsorption has been promoted for control of atmospheric emissions of organic chemicals because it can often achieve the low effluent concentrations and/or high removal efficiencies desired.

Although a lot of data have been generated on the performance of activated carbon to remove specific components from wastewater or air, these data are not summarized in one reference.

The goal of this task order is to review the current and planned uses of activated carbon for treating wastewaters and emissions from the manufacture of organic chemicals, to identify data gaps, and to define programs to fill in these gaps. This information would then become part of the technical data base for use by the EPA in identifying treatment technologies for both wastewater treatment and control of atmospheric emissions.

This report summarizes only the results of the survey of the applications of vapor-phase adsorption. The results of the survey of aqueous-phase adsorption are included in a separate report because there was very little overlap between the two surveys.

II. CONCLUSIONS

A. Vapor-phase adsorption has been applied for controlling emissions and/or solvent recovery in most of the industries that manufacture or use organic chemicals. This survey identified nearly 760 applications with flowrates ranging from 0.5 CFM to 375,000 CFM. (Flowrates are given in English units. Converting the English units used by all sources of data to metric units would only add confusion.)

B. The condition of the data bases used as resources for this survey makes it very difficult to estimate how many adsorption applications were not identified by this survey. All of the state and EPA data bases are currently incomplete. Some data files are being computerized to facilitate data retrieval. Some data files have already been computerized but they are only as useful and complete as the criteria used to decide which data are included in them. When these data files are reviewed, corrected, and updated they will become more useful sources of information.

C. No generalizations can be made on the effectiveness or economics of adsorption as a control device because there are very little data available anywhere on performance and costs. In many cases these data have not been generated yet. When these data have been generated in the past, they have been unavailable because the company using adsorption has restricted publication of these "proprietary" or "confidential" data.

D. Even though the state and EPA files are incomplete, they are the best sources of data on where adsorption has been applied because very little information has been published in the open literature. Companies using adsorption are often reluctant to provide data, particularly performance and cost data, because they consider these data to be confidential. Carbon suppliers and equipment vendors were more cooperative but they were often restricted by confidentiality agreements with their clients.

E. Despite references by many people to the existence of a complete listing of full-scale applications of vapor-phase adsorption, no source of data had a more comprehensive list than the list compiled by this survey.

F. The effort required to survey vapor-phase applications was not an incremental addition to the effort required for surveying aqueous-phase applications because the sources of data for vapor-phase applications to control emissions are completely different from the sources of data for aqueous-phase applications to treat wastewater.

III. RECOMMENDATIONS

A. More performance and cost data are needed to assess the use of vapor-phase adsorption to control emissions but compiling the necessary data base will not require collecting data for all of the applications listed in Table 1. However, Table 1 should be used as a screening tool to identify applications for which more data are desired and to establish priorities in collecting the data.

B. Where existing data on performance and costs are available, they should be scrutinized for accuracy. Many entries in state and EPA files are based on unvalidated engineering estimates incorporated in permit applications. Where data are unavailable, they should be generated using sound analytical procedures.

C. One source of data that should be incorporated in followup activities is the information in the Standards Development Branch, Emissions Standards and Engineering Division, Office of Air Quality Planning and Standards, US EPA, Research Triangle Park, NC. Data from this source were not accessed for this survey because the source was identified at the very end of the data gathering activity.

D. As the data bases being compiled by the state and EPA offices become established and mature, more cross-checking between offices covering the same geographical area should be done to make these data bases more complete and useful.

IV. SURVEY METHODOLOGY

In order to define the effectiveness of full-scale vapor-phase activated-carbon adsorption, a wide variety of data was desired including the following:

1. type and amount of contaminant removed
2. removal efficiency
3. emission flowrate
4. pretreatment requirements
5. number of beds
6. bed dimensions
7. bed configuration
8. superficial velocity
9. type of carbon
10. carbon inventory (in beds only)
11. carbon exhaustion rate
12. regeneration technique
13. carbon loss/regeneration cycle
14. utilities cost
15. operating cost
16. capital costs

These data were sought from a wide variety of sources, including carbon vendors, industrial users of activated carbon, the open literature, government documents, and state and EPA files.

As with the survey of aqueous-phase applications, early attempts to extract information from carbon suppliers, equipment vendors, and companies believed to be using adsorption were very inefficient in terms of the large effort required to gather a small amount of data. Therefore, the survey focused on sources that (1) contained data already in the public domain and (2) were likely to identify many applications at one time. Apparently, very few published references on applications of full-scale vapor-phase adsorption exist because the Lockheed Dialog computerized search of the literature identified very few applications. Most of the applications were identified via searches (often by computer) of some state and federal environmental agencies' files of emission control devices.

This is in direct contrast to the results of survey of full-scale applications of aqueous-phase adsorption for wastewater treatment where very little data were available from government files.

The survey was not limited to applications in the organic chemicals manufacturing industry because the value of the data on full-scale applications is not a function of the industry in which adsorption is used.

The sources contacted during this survey are summarized in Appendix A in order to facilitate any followup activities.

V. RESULTS OF THE SURVEY

Although this survey represents a compilation and review of many data sources, it does not completely describe all of the full-scale vapor-phase applications of activated carbon. The success of this survey was limited by several factors:

1. Identification of all full-scale applications was not possible. Some companies view use of adsorption as proprietary and will not divulge any information. Carbon suppliers and equipment vendors were more cooperative but they were often unable to identify unpublished applications because of secrecy agreements with their clients.

2. The continually expanding data bases and ways to access information contained in these data bases make an exhaustive search very difficult. In fact, most of the searches cannot be considered exhaustive because there were numerous examples where known applications of adsorption were not identified by computerized searches. This was because the applications were not included in the data base.

   This problem will be partially solved as more computerized data bases are established and as gaps in existing data bases are identified and filled. There were several examples where results of searches of state or regional EPA files did not overlap completely with a search of the Federal files for the same geographic area. For example, the one application of vapor-phase adsorption reported in Illinois by the National Emissions Data System was not among the 141 applications reported by the State of Illinois. A small amount of followup showed that these discrepancies could not be easily resolved.

3. Data for the identified applications are not complete especially with respect to cost data and to removal efficiencies for specific components. In many cases the data are simply unavailable because the adsorption units have been installed on the vents and operated automatically with little or no operator attention. Very little specific component analyses have been done to verify the estimated removal efficiencies. When data are available, they are often classified as confidential.

Table 1 lists alphabetically, by state, all of the full-scale applications of vapor-phase adsorption that were identified by this survey. The data in Table 1 were entered in an IBM Office Systems 6 Information Processor in order to expedite the alphabetization of the data base while additions and corrections were made. These data will remain in storage for use in the future. The references for Table 1 are listed in Table 2. This survey is known to be incomplete and it is difficult to estimate how many more adsorbers are in service because of the known deficiencies of the sources of these data.

The shortcomings of most of the data bases used to compile Table 1 are illustrated by the many gaps in the data just for flowrate and/or identity of the compounds in the vents being controlled. (Flowrates are given in English units because all of the sources of data used English units.) Only 25% of the 760 entries for the full-scale applications identified have data on both flowrate and the compounds being adsorbed.

Significant followup will be required to fill the many data gaps in Table 1 and to resolve the many suspected discrepancies. The most prominent kind of discrepancy is whether similar or identical entries in Table 1 refer to more than one similar or identical adsorption system or are really duplicate references to a single application. Multiple references to a single application often caused by supplying slightly different information such as flow, the compounds being adsorbed, or location (city vs county or major city vs suburb) to different regulatory agencies. An attempt was made to correct obvious errors and/or to eliminate duplicate references but this was not always straightforward. As an example it is not clear how many, if any at all, of the 12 adsorption systems listed by NEDS (Reference 1) for the Endicott Labs in Endicott, NY are the same as the 25 units listed by the State of New York (Reference 20) for IBM Corporation in Endicott, NY. On the other hand, it cannot be assumed that similar entries refer to only one application because there are numerous examples of identical adsorption units being installed to control emissions from parallel trains of equipment. Therefore, in most cases the entries in Table 1 have been extracted directly from the references even though they appear to be in error.

No performance or cost data are included in Table 1 because very little data were found. Several references warned that when these data were available,

TABLE 1. FULL-SCALE APPLICATIONS OF VAPOR-PHASE ADSORPTION

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF[a]
Sony Magnetic Prod	Houston Co.	AL	Surface Coating		10,000	1
Fallek-Lankro Corp.	Tuscaloosa	AL	Chem Mfg, Pesticides		105,000	1
Shell Oil Co.	Phoenix	AZ				10
Valley Industrial Services	Anaheim	CA	Dry Cleaning	Stoddard Solvent	8,400	23
Union Oil of California	Avila Beach	CA				10
Sands Drpay	Burbank	CA	Dry Cleaning	Perchloroethylene		1
3M	Camarillo	CA	Surface Coating	Methyl ethyl ketone		1
3M	Camarillo	CA	Surface Coating	Toluene		1
3M	Camarillo	CA	Surface Coating			1
Atlantic Richfield	Carson	CA	Petroleum Refining (wastewater tank)			1
Golden Eagle Ref	Carson	CA	Petroleum Refining			1
Witco Chemical	Carson	CA	Linear Alkylbenzene Manufacture	Benzene, C10 Paraffin	20,000	11
USS Polyester	Colton	CA	Polyester Manufacture			27
USS Polyester	Colton	CA	Polyester and Glycols Manufacture			27
USS Polyester	Colton	CA	Chemical Manufacture			27
Four Corners Pipeline Co.	Corona	CA	Petroleum Storage			1
One Hour Martinizing	Cudahy	CA	Dry Cleaning	Stoddard Solvent		1
Chevron USA Inc.	El Segundo	CA	Wastewater Treatment	Sulfides	5600	28
Chevron USA Inc.	El Segundo	CA	Wastewater Treatment	Sulfides	5200	28
Chevron USA Inc.	El Segundo	CA	Sour Water Tank/Refinery	Hydrogen sulfide, Mercaptans	183	28
Thrifty Wash & Clean	Glendale	CA	Dry Cleaning	Stoddard Solvent		1
Movielab-Hollywood	Hollywood	CA		1,1,1-Trichloroethane	160	33
Fashion Dry Cleaner	Lancaster	CA	Dry Cleaning	Stoddard Solvent		1
AmVac Chemical Corp	Los Angeles	CA		Dibromochloropropane	1800	30
Carriage Trade Cleaners	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1
Cascade Cleaners	Los Angeles	CA	Dry Cleaning	Perchloroethylene	1350-1450	29

(a) See Table 2 for listing of references.

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Consolidated Film	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Consolidated Film	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Consolidated Film	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Consolidated Film	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Consolidated Film	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Consolidated Film	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Deluxe Genl Inc.	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Deluxe Genl Inc.	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Deluxe Genl Inc.	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Deluxe Genl Inc.	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Deluxe Genl Inc.	Los Angeles	CA	Solid Waste Disposal Single Chamber Incineration		25,459	1
Deluxe Genl Inc.	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Deluxe Genl Inc.	Los Angeles	CA	Degreasing	1,1,1-trichloroethane		1
Factory Apron & Towel Supply Inc.	Los Angeles	CA	Dry Cleaning	Perchloroethylene	1350-1450	31
Gravure West	Los Angeles	CA		Toluene, VM&P Naphtha	90,000	12,17
Holiday Coin-Op	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1
Norge Laundry and Dry	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1
Park Cleaners	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1
PICO Clean Ctr	Los Angeles	CA	Dry Cleaning	Perchloroethylene		1
PICO Clean Ctr	Los Angeles	CA	Dry Cleaning	Perchloroethylene		1
Shell Oil Co.	Los Angeles	CA				10
Sloans Dry Cleaners	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1
Sloans Dry Cleaning	Los Angeles	CA	Dry Cleaning	Perchloroethylene		1
Sloans Dry Cleaning	Los Angeles	CA	Dry Cleaning	Perchloroethylene		1
Thrifty Dry Cleaner	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1
Velvetone Cleaners	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Vernon Industrial	Los Angeles	CA	Dry Cleaning	Stoddard Solvent		1
Welchs Ovrl Cln	Los Angeles	CA	Dry Cleaning	Perchloroethylene		1
La Bur Sanitatn	Los Angeles Co.	CA	Dry Cleaning	Perchloroethylene		1
Alco-Gravure Inc.	North Hollywood	CA	Rotogravure			17
Britts Custom Clean	Paramount	CA	Dry Cleaning	Stoddard Solvent		1
B&B Cleaners	Pomona	CA	Dry Cleaning	Perchloroethylene		1
Wardrobe Cleaners	Redondo Beach	CA	Dry Cleaning	Stoddard Solvent		1
Stauffer Chemical Co.	Richmond (Stege)	CA	Ordram Manufacture	Ordram Odor Control	3000	32
Gates-Admiral/Indus	Riverside	CA	Dry Cleaning	Perchloroethylene	1000	1
Gates-Admiral/Indus	Riverside	CA	Dry Cleaning	Perchloroethylene	1000	1
Rohr Industries	Riverside	CA	Surface Coating		5,000	1
Aminoil	Sacramento	CA				10
Arcata Graphics	San Jose	CA	Rotogravure			17
San Jose Graphics	San Jose	CA	Surface Coating			1
San Jose Graphics	San Jose	CA	Printing			1
San Jose Graphics	San Jose	CA	Surface coating			1
San Jose Graphics	San Jose	CA	Printing			1
Caterpillar Tractor Co.	San Leandro	CA	Degreasing	1,1,1-trichloroethane		1
Maxwell House	San Leandro	CA	Roast. Coffee, Surf. Coat., Thin. Solv.			1
Quick Clean Center	Santa Fe	CA	Dry Cleaning	Stoddard Solvent		1
Gulf Oil Co.	Santa Fe Springs	CA	LPG Odorant Loading			1
Aminoil	Stockton	CA				10
Del Amo Cleaners	Torrance	CA	Dry Cleaning	Stoddard Solvent		1
Arapahoe Chemicals Inc.	Boulder	CO	Chemical Manufacture		21,000	1
IBM	Boulder	CO	Surface Coating		2200	1
IBM	Boulder	CO	Surface Coating		10,000	12
IBM	Boulder	CO	Surface Coating		57,727	1
IBM	Boulder	CO			15,000	12

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Phillips Petroleum	Denver	CO				10
Eastman Kodak	Windsor	CO	Surface Coating		15,800	1
Chevron Oil Co.	Bridgeport	CT	Gas Loading			2
Chevron Oil Co.	Bridgeport	CT				2
Columbia Magnetics	Danbury	CT				2
Columbia Magnetics	Danbury	CT	Surface Coating			2
American Cyanamid	Glenbrook	CT	Mixing Kettles			2
American Cyanamid Co.	Glenbrook	CT	Reactors			2
Capital Magnetic Prod	Glenbrook	CT	Coating machines			2
Pfizer, Inc.	Groton	CT				2
Pfizer, Inc.	Groton	CT				2
Pfizer, Inc.	Groton	CT				2
Pfizer, Inc.	Groton	CT				2
Addressograph Multi Corp	Guilford	CT	Coating (Printing)			2
Addressograph Multi Corp	Guilford	CT	Coating (Printing)			2
Burning Division	Guilford	CT				2
Walters Belting Ind.	Middletown	CT	Coating (fabrics)			2
Walters Belting Ind.	Middletown	CT	Coating (fabrics)			2
Walters Belting Ind.	Middletown	CT	Coating (fabrics)			2
Walters Belting Ind.	Middletown	CT	Coating (fabrics)			2
Walters Belting Ind.	Middletown	CT	Coating (fabrics)			2
Macristy Industries	New Britain	CT				2
The Stanley Works	New Britain	CT	Coating Oven			2
Mobil Oil Corp	New Haven	CT	Gas storage tanks			2
Mobil Oil Corp	New Haven	CT	Gas storage tanks			2
Mobil Oil Corp	New Haven	CT	Gas storage tanks			2
Mobil Oil Corp	New Haven	CT	Gas storage tanks			2
Mobil Oil Corp	New Haven	CT	Gas storage tanks			2

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
General Electric Co.	Plainville	CT	Metal Surface Preparation			2
Chevron Oil Co.	Portland	CT	Gas Loading			2
American Cyanamid Co.	Wallingford	CT	Extruders			2
American Cyanamid Co.	Wallingford	CT	Polymer Manufacture			2
American Cyanamid Co.	Wallingford	CT	Thermoplastics Manufacture			2
Stanley Drapery Hardware	Wallingford	CT	Coating (coil)			2
The Stanley Works	Wallingford	CT	Metal Surface Preparation			2
Armstrong Rubber Co.	West Haven	CT	Undertread Cementer			2
C H Dexter	Windosr Locks	CT		Toluene, Isopropyl Alcohol	50,000	12
CH Dexter Division	Windsor Locks	CT	Paper coating			2
Dexter Corp.	Windsor Locks	CT	Hemp TPY			2
Dexter Corp.	Windsor Locks	CT	Hemp TPY			2
Dexter Corp.	Windsor Locks	CT				2
Dexter Corp.	Windsor Locks	CT	Hemp Digester			2
E. I. duPont Chester Run Plant	New Castle	DE	R&D Fabric TRE		850	2
Celanese Fibers Co.	Rome	GA		Acetone	75,000	12
Alcoa Riverdale	Davenport	IA	Petroleum Storage		13,150	1
Alcoa Riverdale	Davenport	IA	Aluminum			1
Meredith Corporation	Des Moines	IA	Rotogravure			17
Winnebago Forest City	Forest City	IA	Surface Coating		296,000	1
A B Dick Co		IL	Coating		20,000	3
A B Dick Co	No	IL	Coater		20,000	3
A B Dick Co	Location	IL	Coater		20,000	3
A B Dick Co	Given	IL	Coater		23,967	3
A B Dick Co	By	IL	Coater		23,967	3
Abbott Laboratories Group Op Div	Illinois	IL	Valproic Acid Reactor		1	3
Amoco Chemicals Corp/Willow Sp Plnt		IL	Polystyrene Process		4	3
Armak Co. Chem. Div.		IL	Storage Tanks	Acrylonitrile		3

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Armak Co. Chem. Div.		IL	Storage Tank	Methyl Formcel		3
Dana Corp/Vator Gasket Div		IL	Mixers		14,550	3
Emulsicoat Inc		IL	Storage	Asphalt	25	3
Family Pride Center		IL	Dry Cleaning			3
Flair Cleaners		IL	Dry Cleaning			3
Flair Cleaners		IL	Dry Cleaning			3
Flair Cleaners		IL	Dry Cleaning			3
Flair Cleaners Inc.		IL	Dry Cleaning			3
Henkel Corp		IL	Storage	Chloroform		3
Henkel Corp		IL	Storage	Acrylonitrile		3
Hopkins Ag Chem/Atlanta Plnt		IL	Chemical Manufacture		6,000	3
Ideal Uniform Rental Co		IL	Dry Cleaning			3
Knox Laundry & Dry Cleaner	No	IL	Dry Cleaning			3
Lamkin Leather & Rubber Co.		IL	Spray Booth and Dryer		6,000	3
Lamkin Leather & Rubber Co.	Location	IL	Spray booth		6,000	3
Lansing Cleaners		IL	Dry Cleaning			3
Lansing Cleaners	Given	IL	Dry Cleaning			3
Marsco Manufacturing Co.		IL	Spray Booth			3
Monarch Laundry Co.	By	IL	Tumble Dryers			3
Monarch Laundry Co.		IL	Tumble Dryers		11,256	3
Morton Norwich Chem/Ringwood Plnt	Illinois	IL	Storage	Ammonium Thiocyanate		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Isopropanol		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage			3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Methyl Ethyl Ketone		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Toluene		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Styrene		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Butyl Acrylate		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Methyl Chloride		3

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Ethyl Acrylate		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Methyl Methacrylate		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Vinylidene Chloride		3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Acrylonitrile		3
Morton Norwich Chem/Ringwood Plnt		IL	Serfene Reactor		5	3
Morton Norwich Chem/Ringwood Plnt		IL	Serfene Blend Tank			3
Morton Norwich Chem/Ringwood Plnt		IL	Reactor			3
Morton Norwich Chem/Ringwood Plnt		IL				3
Morton Norwich Chem/Ringwood Plnt		IL	Storage			3
Morton Norwich Chem/Ringwood Plnt		IL	Latex Reactor			3
Morton Norwich Chem/Ringwood Plnt		IL	Storage			3
Morton Norwich Chem/Ringwood Plnt	No	IL				3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Methyl Acrylate		3
Morton Norwich Chem/Ringwood Plnt	Location	IL	Chemical Manufacture			3
Morton Norwich Chem/Ringwood Plnt		IL	Chemical Manufacture			3
Morton Norwich Chem/Ringwood Plnt	Given	IL	Chemical Manufacture			3
Morton Norwich Chem/Ringwood Plnt		IL	Storage	Methacrylic Acid		3
Morton Norwich Chem/Ringwood Plnt	By	IL	Chemical Manufacture			3
Morton Norwich Chem/Ringwood Plnt		IL				3
Morton Norwich Chem/Ringwood Plnt	Illinois	IL	Storage (wastewater)			3
Morton Norwich Chem/Ringwood Plnt		IL	Dryer			3
Morton Norwich Chem/Ringwood Plnt		IL	Centrifuge			3
Morton Norwich Chem/Ringwood Plnt		IL	Chemical Manufacture			3
Mt. Greenwood Cleaners Inc.		IL	Dry Cleaning	Perchloroethylene		3
Mueller Company		IL				3
Odegaards Foundry & Cleaners Inc.		IL	Dry Cleaning			3
Olson Cleaners		IL	Dry Cleaning			3
One Hour Martinizing		IL	Dry Cleaning			

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
One Hour Martinizing		IL	Laundry Washing			3
One Hour Martinizing		IL	Dry Cleaning			3
Ozite Corp		IL	Rug Preheater			3
Ozite Corp		IL	Latex Foam Oven			3
Palatine Drive-In Cleaners Inc.		IL	Dry Cleaning			3
Phoenix Closures		IL	Liquid Rubber Mixing		11,290	3
Plastic Capacitors Plant #3		IL	Paper Tube Roller			3
Quincy Soybean Co.		IL	Extractor	Hexane	100	3
R. R. Donnelley & Sons Co.	No	IL	Rotogravure		192,000	3
R. R. Donnelley & Sons Co.		IL				3
R. R. Donnelley & Sons Co.	Location	IL				3
R. R. Donnelley & Sons Co.		IL	Rotogravure		192,000	3
R. R. Donnelley & Sons Co.	Given	IL	Rotogravure		192,000	3
R. R. Donnelley & Sons Co.		IL	Rotogravure		192,000	3
R. R. Donnelley & Sons Co.	By	IL	Rotogravure		192,000	3
R. R. Donnelley & Sons Co.		IL	Rotogravure		192,000	3
Staley Chemical	Illinois	IL	Reactor			3
Stinsons Laundry & Dry Cleaners		IL	Dry Cleaning			3
Swift Edible Oil Co. Refining		IL	Oil Storage			3
Swift Edible Oil Co. Refining		IL	Oil Storage			3
Swift Edible Oil Co. Refining		IL	Oil Storage			3
Swift Edible Oil Co. Refining		IL	Oil Storage			3
Tip Top Cleaners		IL	Dry Cleaning	Perchloroethylene		3
Town & County Cleaners		IL	Dry Cleaning			3
Travenol Laboratories Inc		IL	Degreaser	Freon	1,000	3
Travenol Laboratories Inc		IL	Degreaser	Freon	1,000	3
Trim Cleaners		IL	Dry Cleaning			3
Tuck Industries Inc.		IL	Coater	Heptane	15,200	3

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Tuck Industries Inc.		IL	Coater	Toluene	15,200	3
Tuck Industries Inc.		IL	Coater		15,200	3
Tuck Industries Inc.		IL	Solvent Reocvery		11,750	3
Tuck Industries Inc.		IL	Solvent Recovery		25,600	3
Tuck Industries Inc.		IL	Coater		25,600	3
Turco Products Div		IL	Chemical Blending Tanks		800	3
U.S. Industrial Chemicals		IL	Sulfuric Acid Production			3
V. J. Dolan & Co. Inc.		IL	Mix Tanks		2,000	3
V. J. Dolan & Co. Inc.		IL	Sand Mills		2,000	3
V. J. Dolan & Co. Inc.	No	IL	Mix Tanks		2,000	3
V. J. Dolan & Co. Inc.		IL	Filling Station		2,000	3
V. J. Dolan & Co. Inc.	Location	IL	Mixers and Tanks		2,000	3
V. J. Dolan & Co. Inc.		IL	Holding Tanks		2,000	3
V. J. Dolan & Co. Inc.	Given	IL	Filling Station		2,000	3
V. J. Dolan & Co. Inc.		IL	Heating Kettles		4,000	3
VioBin Corp	By	IL	Wheat Germ Extraction	Hexane	1,500	3
VioBin Corp		IL	Solvent Extraction	Ethylene Dichloride	2,000	3
VioBin Corp	Illinois	IL	Desolventizer Tissue Plant	Ethylene Dichloride		3
VioBin Corp		IL	Cooker			3
VioBin Corp		IL	Cooker			3
VioBin Corp		IL	Fat Kettle			3
VioBin Corp		IL	Accumulator			3
VR/Wesson		IL			800	3
Warner Lambert		IL	Curing Oven			3
Weber Marking Systems Inc.		IL	Coating (stencil)			3
Western Electric Co Inc		IL	Spray Booth		650	3
Western Electric Co Montgomery Plant		IL	Soldering			3
World Color Press		IL	Rotogravure		8,200	3

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
World Color Press		IL	Rotogravure		8,200	3
World Color Press		IL	Rotogravure		8,200	3
World Color Press	No	IL	Rotogravure		8,200	3
World Color Press	Location	IL	Rotogravure		8,200	3
World Color Press	Given	IL	Rotogravure		70,000	3
World Color Press	By	IL	Press		70,000	3
World Color Press	Illinois	IL	Press		70,000	3
World Color Press		IL	Rotogravure		70,000	3
World Color Press		IL	Rotogravure		70,000	3
World Color Press		IL	Rotogravure		70,000	3
Shell Oil Co.	Bedford Park	IL				10
Amoco	Berwyn	IL				10
Chicago Rotoprint	Chicago	IL	Rotogravure		20,000	13
Phillips Petroleum Co.	Decatur	IL				10
Amoco	Des Plaines	IL				10
Cities Service Co.	Des Plaines	IL				10
Shell Oil Co.	Des Plaines	IL				10
Union Oil	Des Plaines	IL				10
Energy Cooperative Inc.	East Chicago	IL				10
Phillips Petroleum Co.	East Chicago	IL				10
Phillips Petroleum Co.	East St. Louis	IL				10
Phillips Petroleum Co.	Kankakee	IL				10
Union Oil	Lemont	IL				10
Deere Planter Works	Moline	IL	Surface Coating			1
Reichhold Chemical Inc	Morris	IL	Maleic Anhydride Catalytic Reactor	Benzene	43,000	3, 24
Kable Printing Co.	Mt. Morris	IL		Toluene, Xylene	120,000	12
World Color Press	Salem	IL	Rotogravure		70,000	13
World Color Press	Salem	IL	Rotogravure		140,000	13

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Kerr-McGhee	Clairmont	IN	Petroleum Storage/Handling			4
Phillips Petroleum	Clairmont	IN	Petroleum Storage/Handling			4
Sun Oil Co	Clairmont	IN	Petroleum Storage/Handling			4
Triangle	Clairmont	IN	Petroleum Storage/Handling			4
Sunmark Industries	Clermont	IN				10
ARA Cleaners and Alterations	East Chicago	IN	Dry Cleaning	Perchloroethylene		1
ECI	East Chicago	IN	Petroleum Storage/Handling			4
M4 Method Cleaners	East Chicago	IN	Printing			3
Silver Cleaners	East Chicago	IN	Dry Cleaning	Perchloroethylene		1
Rexham Corp	Edinburg	IN				4
Riegel Paper Corp.	Edinburg	IN		Toluene, Ethyl Acetate	10,000	12
Miles Laboratories	Elkhart	IN			11,000	12
Phillips Petroleum	Indianapolis	IN				10
Triangle Refineries	Indianapolis	IN				10
Western Electric Co	Indianapolis	IN	Surface Coating			1
Western Electric Co	Indianapolis	IN	Surface Coating			1
Farm Bureau	Jolietville	IN	Petroleum Handling/Storage			4
R. R. Donnelley	Mattson	IN	Rotogravure		160,000	13
R. R. Donnelley	Warsaw	IN	Rotogravure			4
R. R. Donnelley	Warsaw	IN	Rotogravure		375,000	13
Indiana Farm Bureau	Westfield	IN				10
General Electric Co	Allen Co.	KY	Organic Solvent		5,509	1
Brown Printing Co.	Bowling Green	KY				17
Holley Carburetor Div	Bowling Green	KY	Degreasing	Trichloroethylene	2,507	1
Crown Zellerbach Corp.	Florence	KY	Paper coating		28,286	1
Crown Zellerbach Corp.	Florence	KY	Surface Coating		28,286	1
Crown Zellerbach Corp.	Florence	KY		Toluene, Methanol	30,000	12
Swedcost, Inc	Florence	KY	Plastics Production			1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Swedcost, Inc.	Florence	KY	Plastics Production		176	1
CAMCO Chemical Co	Fort Thomas	KY	Polypropylene Production		8,087	1
DuPont	Greenup Co	KY	Plastics Production	Freon 11 and 114 ABS	7,592	1
IBM	Lexington	KY	Surface Coating		10,982	1
IBM	Lexington	KY	Surface Coating		11,406	1
Continental Forest Ind	Louisville	KY	Printing		9,993	1
Fawcett Printing Corp.	Louisville	KY	Rotogravure	Toluene, Xylene, Naphtha aliphatics, et al	108,000	12
Spalding Laundry	Louisville	KY	Dry Cleaning	Perchloroethylene		1
Spalding Laundry	Louisville	KY	Dry Cleaning	Perchloroethylene		1
Standard Gravure Corp.	Louisville	KY	Rotogravure	C6-C7	240,000	17, 25
Swiss Cleaners & Laundry	Louisville	KY	Dry Cleaning	Perchloroethylene		1
Borg-Warner	Madisonville	KY	Degreasing		3,107	1
DuPont	Wirtland	KY		"Freon"	8,000	12
Hooker Chemicals	Hahnville	LA	Reprocessed Chlorinated Hydrocarbons		227	5
Murphy Oil Co.	Meroux	LA				10
Georgia Pacific Corporation	Plaquemine	LA	Chemical Manufacture	Cumene Cumene Hydroperoxide	12.4	5
Clearwater Fabric	Boston	MA	Dry Cleaning	Perchloroethylene		1
Scott Graphics	Holyoke	MA		Toluene, Ketones, Alcohols	15,000	12
House of David	Lynn	MA	Dry Cleaning	Perchloroethylene	340	1
Whyte Enterprise	Lynn	MA	Dry Cleaning	Perchloroethylene		1
Lawson Coin Wash	Natick	MA	Dry Cleaning	Perchloroethylene		1
Holly Cleaners	Newton	MA	Dry Cleaning	Perchloroetylene		1
Whiting and Davis	Planville	MA	Degreasing	Perchloroethylene	625	1
Marquis Cleaners	Salem	MA	Dry Cleaning	Perchloroethylene		1
Salem Laundry	Salem	MA	Dry Cleaning	Perchloroethylene		1
Launderite Uniform	Wakefield	MA	Dry Cleaning	Perchloroethylene		1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
J L Thompson Rivet Corp	Waltham	MA	Degreasing	Trichloroethylene		1
J L Thompson Rivet Corp	Waltham	MA	Degreasing	Trichloroethylene		1
Polaroid	Waltham	MA	Photographic Film Coating	Mixed Ketones	6,000	22
Celanese	Cumberland	MD		Acetone	112,500	12
B. P. Oil Co.	Finksburgh	MD				10
Dow Chemical	Midland	MI	Chlorobenzene Manufacture	Benzene and monochlorobenzene		6
Dow Chemical	Midland	MI	Chlorobenzene Manufacture	Paradichlorobenzene		6
Standard Oil of Ohio	Taylor	MI				10
General Motors	Warren	MI			500	12
Ford Motor Co.	Wayne	MI		Xylene, Butanol, Cellosolve, Methyl Ethyl Ketone	20,000	12
Ford Motor Co.	Wayne	MI	Automotive Top Coat Spray		6,000	22
Anderson Corporation	Bayport	MN	Surface Coating		3,000	1
Anderson Corporation	Bayport	MN	Surface Coating		1300	1
Anderson Corporation	Bayport	MN	Surface Coating		950	1
Anderson Corporation	Bayport	MN	Surface Coating			1
Thermo King Corp	Minneapolis	MN	Degreasing	1,1,1-trichloroethane	42	1
Thermo King Corp	Minneapolis	MN	Degreasing			14
Thermo King Corp	Minneapolis	MN	Surface Coating	Toluene	42	1
Shell Oil Co.	St. Paul	MN				10
Williams Pipeline Co.	St. Charles	MO				10
J. D. Streett	St. Louis	MO				10
Texaco Inc.	St. Louis	MO				10
Triangle Refinery	St. Louis	MO				10
W. F. Hall	Corynth	MS	Rotogravure		65,000	13
Norton Corporation	Clover	NC		Toluene, VM&P Naphtha	25,000	12
Lorillard Greensboro Plt	Greensboro	NC	Cigarette manufacture		3,545	1
Lorillard Greensboro Plt	Greensboro	NC	Cigarette manufacture	CCl_3F	3,545	1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Shuford Mills	Hickory	NC	Tape Manufacture			21
Hercofina	New Hanover Co.	NC	Chemical Manufacture	p-Xylene	24,530	1
Hercofina	New Hanover Co.	NC	Industrial Process	"Armtc mthyl"	24,530	1
Hercofina	New Hanover Co.	NC	Chemical Manufacture	p-Xylene	24,530	1
Hercofina	New Hanover Co.	NC	Industrial Process	Aromatic Methyl Ester		1
Hercofina	New Hanover Co.	NC	Chemical Manufacture	"Reactor armic ad, mth"	24,500	1
Hercofina	New Hanover Co.	NC	Chemical Manufacture	"Reactor armic ad, mth"	24,500	1
Hercofina	Wilmington	NC	Dimethyl Terephthalate Manufacture	p-Xylene and other HC's	42,000	19
Phillips Petroleum	Carteret	NJ				10
Reichhold Chemical	Elizabeth	NJ	Maleic Anhydride Manufacture	Benzene	27,000	1
				Maleic Anhydride		
Ottex Inc	Fairfield	NJ	Textile Products		800	1
Phillips Petroleum	Gloucester	NJ				10
Phillips Fuel Co.	Hackensack	NJ				10
Western Electric Co	Kearny	NJ			700	1
Celanese Plastics	Newark	NJ	Plastics Production		12,611	1
Celanese Plastics	Newark	NJ	Plastics Production		7,211	1
Celanese Plastics	Newark	NJ	Plastics Production		13,100	1
Celanese Plastics	Newark	NJ	Plastics Production		12,351	1
Celanese Plastics	Newark	NJ	Plastics Production		10,000	1
Sunmark Industries	Newark	NJ				10
Burroughs Corp.	Park Ridge	NJ		Methyl ethyl ketone, Toluene	6,000	12
Combinates Corp	Passaic	NJ	Dry Cleaning	Perchloroethylene	530	1
Combinates Corp	Passaic	NJ	Dry Cleaning	Perchloroethylene	530	1
NU-Method Dyeing and Proc	Union City	NJ	Degreasing	Perchloroethylene	1500	1
NU-Method Dyeing and Proc	Union City	NJ	Degreasing	Perchloroethylene	1500	1
Chevron Oil	Albuquerque	NM				10
Continental Oil	Albuquerque	NM				10

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Shell Oil Co.	Sparks	NV				10
Kallmorgen Corp Photocircuits	Aquebogue	NY	Solvent Stripping	Aliphatic Cl Cmpd	2,000	1,20
Tuck Industries Inc.	Beacon	NY	Roller coating machines	Toluene	10,952	20
Tuck Industries Inc.	Beacon	NY	Roller coating machines	Toluene	10,952	20
Tuck Industries Inc.	Beacon	NY	Roller coating machines	Toluene	10,952	20
GAF Corp	Binghamton	NY		Methyl chloride Methyl alcohol	6,900	1, 20
GAF Corp	Binghamton	NY	Chem specialty pilot plant	Hydrogen Chloride	16,000	1, 20
GAF Corp.	Binghamton	NY		Methyl chloride, other aliphatic chlorides	5,150	20
M. Wile and Co.	Buffalo	NY	Dry cleaning	Perchloroethylene	400	1, 20
M. Wile and Co.	Buffalo	NY	Dry cleaning	Perchloroethylene	400	1, 20
Trico Products Corp.	Buffalo	NY	Degreasing	Trichloroethylene	3,300	1, 20
Labelon-Hopewell Pl	Canandaigua	NY		Dimethyl Ketone	9,000	1,20
Labelon-Hopewell Pl	Canandaigua	NY	Paper Coating	Toluene, Methyl Ethyl Ketone, Dimethyl Ketone, Ethanol, Acetates, Others	1,750	20
F. N. Burt	Cheektowaga	NY	Solvent coating	Toluene	3,800	20
Nashua Industrial Tape Div.	Colonie	NY	Tape Coater	Toluene, Nonmethane alkane	17,500	20
Nashua Industrial Tape Div.	Colonie	NY	Tape Coater	Toluene, Nonmethane alkane		20
Nashua Industrial Tape Div.	Colonie	NY	Tape Coater	Toluene, Nonmethane alkane	17,500	20
Nashua Industrial Tape Div.	Colonie	NY	Tape Coater	Toluene, Nonmethane alkane		20
Nashua Industrial Tape Div.	Colonie	NY	Tape Coater	Toluene, Nonmethane alkane	17,500	20
Nashua Industrial Tape Div.	Colonie	NY	Tape Coater	Toluene, Nonmethane alkane		20
Arcata Graphics BFLO	Depew	NY		Toluene, xylene, misc. organics, Naphthalene	20,000	20

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Arcata Graphics BFLO	Depew	NY		Toluene, xylene, misc. organics, naphthalene	20,000	20
Arcata Graphics BFLO	Depew	NY		Toluene, Xylene Misc. Organics, Naphthalene	50,000	20
Arcata Graphics BFLO	Depew	NY		Toluene, Xylene, Misc. Organics, Naphthalene	50,000	20
Arcata Graphics BFLO	Depew	NY		Toluene, Xylene, Misc. Organics, Naphthalene	50,000	20
Arcata Graphics BLFO	Depew	NY		Toluene, Xylene Misc. Organics, Naphthalene	20,000	20
Carrier Air Cond. Corp.	Dewitt	NY	Degreaser	Trichloroethylene	5,500	1,20
Carrier Air Cond. Corp.	Dewitt	NY	Degreaser	Trichloroethylene	3,230	1,20
E. Fishkill Facility	Dutchess Co.	NY	Vapor Degreasing		6,200	1
E. Fishkill Facility	East Fishkill	NY	Degreasing	Perchloroethylene	8,260	20
Endicott Lab	Endicott	NY	Developer	Other acetates	800	1
Endicott Lab	Endicott	NY			3,600	1
Endicott Lab	Endicott	NY	Developer		500	1
Endicott Lab	Endicott	NY			1,200	1
Endicott Lab	Endicott	NY			3,910	1
Endicott Lab	Endicott	NY			1,250	1
Endicott Lab	Endicott	NY	Degreaser		1,600	1
Endicott Lab	Endicott	NY	Degreaser		3,730	1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Endicott Lab	Endicott	NY			2,730	1
Endicott Lab	Endicott	NY	Developer		3,000	1
Endicott Lab	Endicott	NY			600	1
Endicott Labs	Endicott	NY	Spray Degreasing		1,250	1
IBM Corp.	Endicott	NY	Developer	Trichloroethylene	800	20
IBM Corp.	Endicott	NY		Methyl Chloride	3,600	20
IBM Corp.	Endicott	NY	Developer	Chloroform	500	20
IBM Corp.	Endicott	NY		Trichloroethane	600	20
IBM Corp.	Endicott	NY		Aliphatic Halogens	1,200	20
IBM Corp.	Endicott	NY	Degreaser	Perchloroethylene	8,670	20
IBM Corp.	Endicott	NY	Tinners	Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY		Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY		Trichloroethane	1,000	20
IBM Corp.	Endicott	NY		Aliphatic chloride compound	1,700	20
IBM Corp.	Endicott	NY	Tinner	Perchloroethylene, IPA	3,010	20
IBM Corp.	Endicott	NY	Wave Solder	Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY		Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY	Vapor Degreasing	Perchloroethylene, IPA	12,650	20
IBM Corp.	Endicott	NY	Tinners	Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY	Tinners	Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY		Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY	Tinner exhausts	Perchloroethylene, IPA	5,110	20
IBM Corp.	Endicott	NY	Wave solder machines	Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY		Perchloroethylene, IPA		20
IBM Corp.	Endicott	NY		Methyl chloride	1,250	20
IBM Corp.	Endicott	NY	Spray Degreasing	Chloroform	1,250	20
IBM Corp.	Endicott	NY	Degreaser	Trichloroethylene	1,600	20
IBM Corp.	Endicott	NY		Aliphatic Chloride Compound	2,730	20

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
IBM Corp.	Endicott	NY	Developer	Trichloroethane	3,000	20
Hygrade Metal Mldg Mfg Corp	Farmingdale	NY		Perchloroethylene	3,200	1,20
Endo Laboratories	Garden City	NY	Film Coating	Methylene Chloride, IPA	500	1,20
Elmgrove Plant	Gates	NY	Degreasing	Trichloroethylene	1,700	1,20
Photocircuits	Glen Cove	NY	Solvent Stripping	Chlorinated Aliphatic	2,000	1,20
Photocircuits	Glen Cove	NY	Curing Oven		4,700	20
Kodak Park Div.	Greene	NY	Drying and Curing	Dimethyl Ketone, Methanol, Ethanol, Isopropanol, Aliphatic alcohol, aliphatic Cl cmpd, methyl ethyl ketone, aliphatic ketones	18,000	20
Kodak Park Div.	Greene	NY	Coating Drying and Curing	Dimethyl Ketone, Methanol, Aliphatics	40,000	20
Kodak Park Div.	Greene	NY		Aliph Cl compound, Methanol, Dimethyl Ketone, Naphthenes, Aliphatic Alcohol	3,000	20
Kodak Park Div.	Greene	NY		Nonmethane alkane, Toluene, Methanol, Ethanol, Dimethyl Ketone, Methyl Ethyl Ketone	12,000	20

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Kodak Park Div.	Greene	NY	Film Coating	Dimethyl Ketone, Aliphat. Cl cmpd, Methanol, Toluene, MEK, Trichloroethane, MIBK, Cyanide Comp NEC, Chloroform, Ethanol, Alipha Ethers	26,000	20
Kodak Park Div.	Greene	NY	Film Coating	Dimethyl Ketone, Aliphatic Cl cmpd, Methanol, Toluene, MEK, Trichloroethane, MIBK, Cyanide cmpd, Chloroform, Ethanol, Aliphatic Ethers	26,000	20
Vic Industries Corp	Harnell	NY	Degreaser	Trichloroethylene	3,000	20
Nepera Chemical Co Inc	Harriman	NY	Storage Tanks	Benzene, Aromatic N Cmpds	13.4	20
Nepera Chemical Co Inc	Harriman	NY		Benzene, Aromatic N Cmpds	20.1	20
Nepera Chemical Co Inc	Harriman	NY	Storage Tank	Benzene, Aromatic N Cmpds	13.2	20
Nepera Chemical Co Inc	Harriman	NY	Storage Tank	Benzene, Aromatic N Cmpds		20
Nepera Chemical Co Inc	Harriman	NY	Storage Tanks	Benzene, Aromatic N Cmpds		20
Nepera Chemical Co Inc	Harriman	NY	Storage Tanks	Benzene, Aromatic N Cmpds		20
Nepera Chemical Co Inc	Harriman	NY	Storage and Loading	Benzene, Aromatic N Cmpds	15	20
Nepera Chemical Co Inc	Harriman	NY	Storage	Benzene, Aromatic N Cmpds	13.3	20
Hilard Chemical Corp	Hauppauge	NY	Spray Dryer	Aliphatic Cl Cmpd	750	20
Knitcrest Fabrics	Hauppauge	NY	Dry Cleaning	Perchloroethylene	2,840	20
Universal Instruments Corp.	Kirkwood	NY	Solvent degreaser; wave solder machine	Perchloroethylene Misc. organics Isopropyl Alcohol	9,200	20

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
GM Harrison Radiator Div.	Lockport	NY	Vapor Degreaser	Trichloroethylene	658	1, 20
GM Harrison Radiator Div.	Lockport	NY	Vapor Degreaser	Perchloroethylene	3,000	20
GM Harrison Radiator Div.	Lockport	NY	Vapor Degreaser	Trichloroethylene	3,000	20
Harrison Radiator Div.	Lockport	NY	Vapor Degreasing	Trichloroethylene	2,940	20
Harrison Radiator Div.	Lockport	NY	Vapor Degreasing	Trichloroethylene	2,940	20
Harrison Radiator Div.	Lockport	NY	Vapor Degreaser	Trichloroethylene	2,940	20
New York News Inc.	Long Island	NY	Rotogravure			17
AMF Inc.	Lowville	NY		Xylol, VM&P Naphtha, Cellusolve	6,500	12
Technical Tape	New Rochelle	NY		Toluene, Heptane	85,000	12
Stauffer	Newburgh	NY	Coating	MEK, MIBK	16,000	1,20
Stauffer	Newburgh	NY	Coating	MEK, MIBK	16,000	1,20
Stauffer	Newburgh	NY	Coating	Toluene, Acetates	11,000	20
Hooker Chemical Corp.	Niagara Falls	NY	Chemical Manufacture	Toluene	166	20
Sunmark Industries	Oceanside	NY				10
IBM Corp	Owego	NY	Solder Cleaning	Trichloroethane	855	1,20
IBM Corp	Owego	NY	Spray Brush Scrubber	Aliphatic Cl Cmpd	1700	1,20
Garlock Inc.	Palmyra	NY	Sheeter	Nonmethane alkanes	11,000	1,20
Garlock Inc.	Palmyra	NY	Sheeter	Nonmethane alkanes	11,000	1,20
Garlock Inc.	Palmyra	NY	Sheeter	Nonmethane alkanes	11,000	1,20
Materials Research Corp	Pearl River	NY	Ceramic Slurry Drying	Trichloroethane, Ethanol	17,700	1,20
IBM Corp	Poughkeepsie	NY	Circuit Board Etching		3,000	1
IBM Corp	Poughkeepsie	NY	Circuit Board Stripping		3,000	1
Eastman Kodak	Rochester	NY		Methylene chloride and others	40,000	12
GM Rochester Products Div.	Rochester	NY	Carburetor Test Manifold		4,000	20
GM Rochester Products Div.	Rochester	NY	Carburetor Test Manifold		4,000	20
GM Rochester Products Div.	Rochester	NY	Carburetor Test Vacuum Manifold		4,000	20

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
GM Rochester Products Div.	Rochester	NY	Carburetor Test Vacuum Manifold	Alipahtic Alcohols and Aldehydes	4,000	20
GM Rochester Products Div.	Rochester	NY	Carburetor Test Vacuum Exhaust		4,000	20
GM Rochester Products Div.	Rochester	NY	Carburetor Test Vacuum Exhaust		4,000	20
GM Rochester Products Div.	Rochester	NY	Vapor Degreaser	Trichloroethylene	800	1,20
GM Rochester Products Div.	Rochester	NY	Vapor Degreaser	Trichloroethylene	800	1,20
GM Rochester Products Div.	Rochester	NY	Vapor Degreaser	Trichloroethylene	800	1,20
GM Rochester Products Div.	Rochester	NY	Degreasing	Trichloroethylene	800	1,20
GM Rochester Products Div.	Rochester	NY	Vapor Degreasing	Trichloroethylene	1700	1,20
GM Rochester Products Div.	Rochester	NY	Vapor Degreasing	Trichloroethylene	1700	1,20
GM Rochester Products Div.	Rochester	NY	Vapor Degreasing	Trichloroethylene	1700	1,20
GM Rochester Products Div.	Rochester	NY	Vapor Degreasing	Trichloroethylene	800	1,20
Hawk-Eye Plant	Rochester	NY	Degreaser	Trichloroethylene	2,200	1,20
Hawk-Eye Plant	Rochester	NY	Testing Hoods	Aliphatic Halogenated HC	12,914	20
Hawk-Eye Plant	Rochester	NY	Cleaning and Cementing	Acetone, MEK		20
Kodak Park Div.	Rochester	NY	Film Coating		26,000	1
Kodak Park Div.	Rochester	NY	Film Coating		26,000	1
Kodak Park Div.	Rochester	NY			12,000	1
Stromberg Carlson	Rochester	NY		Methylene Chloride	1,800	1,20
General Electric Co.	Salina	NY	Vapor Degreaser	Trichloroethylene Aromatic N Compound	1,839	1,20
Texas East Transmission Corp.	Selkirk	NY	Truck loading	Ethyl Mercaptan, Propane	179	1,20
Texas East Transmission Corp.	Selkirk	NY	Rail car loading	Ethyl Mercaptan, Propane	179	1,20
GTE Sylvania Inc	Seneca Falls	NY	Degreaser	Trichloroethylene	2,280	1,20
Oneida Silversmiths	Sherrill	NY	Degreasing	Trichloroethylene	1,085	1,20
Bristol Myers	Syracuse	NY	Antibiotics Manufacture	MIBK, Acetone	6,350	1,12,20
Bristol Myers	Syracuse	NY	Antibiotics Manufacture	MIBK, Acetone		12,20
Otisca Industries Limited	Syracuse	NY	Extraction Pilot Plant	Aliphatic Cl Cmpd	5	1,20

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Otisca Industries Limited	Syracuse	NY		Aliphatic Cl Cmpd		20
RE Dietz	Syracuse	NY	Vapor Degreaser	Trichloroethylene	1,440	1,20
Booth Oil Co. Inc.	Tonawanda	NY	Oil Demulsification		11	20
Behr-Manning Company	Troy	NY		Toluene	20,000	12
Behr-Manning Company	Troy	NY		Toluene	40,000	12
Xerox	Webster	NY	Spray Dryer	Chloroform	1,350	1,20
Xerox	Webster	NY	Metal Coating	Methyl Ethyl Ketone	600	1,20
Xerox	Webster	NY	Spray Dryer	Chloroform		20
Xerox	Webster	NY	Circuit Board Cleaning	Chloroform		20
Xerox	Webster	NY	Spray Dryer	Chloroform		20
Xerox	Webster	NY	Spray Dryer	Chloroform		20
Xerox	Webster	NY	Spray Dryer	Chloroform, Misc. Organics		20
Xerox	Webster	NY	Spray Dryer	Chloroform		20
Standard Oil of Ohio	Akron	OH				12
Sunmark Industries	Akron	OH				10
Shell Chemical Co.	Bel Pre	OH		Cyclohexane	10,000	12
Cities Service Co.	Brecksville	OH				10
Standard Oil of Ohio	Canton	OH				10
Standard Oil of Ohio	Cincinnati	OH				10
Standard Oil of Ohio	Cleveland	OH				10
Sunmark Industries	Cleveland	OH				10
Union Oil	Cleveland	OH				10
Phillips Petroleum	Columbus	OH				10
Shell Oil Co	Columbus	OH				10
Standard Oil of Ohio	Columbus	OH				10
Sunmark Industries	Columbus	OH				10
Union Oil	Columbus	OH				10
Dayton Press	Dayton	OH	Rotogravure		64,000	13

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Dayton Press Inc.	Dayton	OH	Gravure		36,320	7
Inland Div Plant 1	Dayton	OH	Vapor Finishing		2,000	7
Inland Div Plant 2	Dayton	OH	Coater and Oven		70,000	7
Inland Div Plant 2	Dayton	OH	Coater and Oven		70,000	7
Inland Manufacturing Company	Dayton	OH		Xylene	75,000	12
Inland Manufacturing, General Motors	Dayton	OH		Xylene	100,000	12
Shell Oil Co.	Dayton	OH				10
Standard Oil of Ohio	Dayton	OH				10
Sunmark Industries	Dayton	OH				10
Union Oil	Dayton	OH				10
Moore Business Forms	Fremont	OH			25,000	12
Marathon Oil Co.	Lebanon	OH				10
Shell Oil Co.	Lima	OH				10
Standard Oil of Ohio	Lima	OH				10
Standard Oil of Ohio	Lorrain	OH				10
Textileather Div of Gen Tire/Rubber	Lucas Co.	OH	Printing/Finishing			1,7
Laminated & Coated Products Div	Miami Co.	OH	Surface Coating		22,000	1
Inland Division	Montgomery Co.	OH	Motor Vehicle Parts		2,000	1,7
Inland Division	Montgomery Co.	OH	Surface coating		70,000	1
Inland Division	Montgomery Co.	OH	Surface Coating		70,000	1
Inland Division	Montgomery Co.	OH	Surface Coating		70,000	1
Inland Division	Montgomery Co.	OH	Surface Coating		70,000	1
Standard Oil of Ohio	Niles	OH				10
Fasson Tech Center	Painesville	OH	Coaters and Dryers		48,000	7
Fasson Tech Center	Painesville	OH	Coaters and Dryers		50,000	7
Standard Oil of Ohio	Sciotsville	OH				10
Springfield Gravure Corp.	Springfield	OH	Rotogravure		39,000	7
PPG Industries/Barberton Plant	Summit Co.	OH	Resins Manufacturing		5,400	1,7

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Union Oil	Talmadge	OH				10
Standard Oil of Ohio	Tiffin	OH				10
Standard Oil of Ohio	Todhunter	OH				10
Cities Service Co.	Toledo	OH				10
General Tire & Rubber Co.	Toledo	OH		Methyl Ethyl Ketone		34
Shell Oil Co.	Toledo	OH				10
Standard Oil of Ohio	Toledo	OH				10
Sunmark Industries	Toledo	OH				10
Union Oil	Toledo	OH				10
Brown-Bridge Mills Inc.	Troy	OH		Toluene, Methanol	20,000	12
Inmont Automotive	Whitehouse	OH	Spray Drying		400	7
Fasson Div of Avery	Bucks Co.	PA	Surface Coating		87,075	1
Fasson Div of Avery	Bucks Co.	PA	Surface Coating		47,170	1
Diversified Printing Corproute	Chester Co.	PA	Gravure		30,000	1
Diversified Printing Corproute	Chester Co.	PA	Gravure		21,000	1
Diversified Printing Corproute	Chester Co.	PA	Gravure		21,000	1
Diversified Printing Corproute	Chester Co.	PA	Gravure		30,000	1
Woolrich, Inc.	Clinton Co.	PA	Dry Cleaning		70	1
Avtex Fibers Inc	Crawford Co.	PA	Surface Coating	Acetone	80,379	1
American Can Company	Cumberland Co.	PA	Surface Coating		6,880	1
FMC Corp	Delaware Co.	PA	Surface Coating		93,426	1
Sun Oil of PA	Delaware Co.	PA	Petroleum, fugitive HC emissions	Benzene	67	1
Armstrong Cork	Lancaster	PA		Xylene	10,000	12
Aluminum Co	Lancaster Co.	PA	Degreasing		1,500	1
Armstrong Cork	Lancaster Co.	PA	Plastics Production			1
Armstrong Cork	Lancaster Co.	PA	Plastics Production			1
Std Coated Prod	Luzerne Co	PA	Textiles-Blending Area		25,000	1
Std Coated Prod	Luzerne Co.	PA	Gravure		25,000	1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Std Coated Prod	Luzerne Co.	PA	Laminator		25,000	1
Std Coated Prod	Luzerne Co.	PA	Gravure (textiles)		18,600	1
Alco Corp	Philadelphia	PA	Fabricated rubber loading & storage			1
Aldon Rubber Co.	Philadelphia	PA	Surface coating		14,000	1
Allied Chemcal	Philadelphia	PA	Phenol Production		10,000	1
Allied Chemical	Philadelphia	PA	Phenol Oxidizer		10,000	1
Allied Chemical	Philadelphia	PA	Phenol oxidizer		5,540	1
Allied Chemical	Philadelphia	PA	Phenol		5,540	1
Allied Chemical	Philadelphia	PA	Phenol oxidizer		10,770	1
Allied Chemical	Philadelphia	PA	Phenol		10,770	1
Sunmark Industries	Twin Oaks	PA				10
Sunmark Industries	Willow Grove	PA				10
Adhesives Research Inc.	York Co.	PA	Coating Oven		6,000	
Adhesives Research Inc.	York Co.	PA	Coating Oven		12,000	1
Adhesives Research Inc.	York Co.	PA	Coating Oven		3,000	1
Agway Inc	York Co.	PA			3,000	1
Agway Inc.	York Co.	PA	Pesticides		6,000	1
Roche	Manati Co.	PR	Pesticide Packaging		4,000	1
Union Carbide	Ponce	PR	Pharmaceutical Preparation	Fluorazepam HCl	9,223	1
Mobil Oil	East Providence	RI	Organic Chemical		10,650	1
Lebanon Knitting	Pawtucket	RI	Asphalt Blending			1
Clvlnd Twist	Providence	RI	Dry Cleaning	Perchloroethylene		1
IMP Knife	Providence	RI	Degreasing	"Safety Solvent"	300	1
IMP Knife	Providence	RI		Trichloroethylene		1
Prov Gravure	Providence	RI	Gravure	Trichloroethylene		1
Prov Gravure	Providence	RI	Gravure	Toluene		1
Prov Gravure	Providence	RI		"Lactol"		1
				Toluene		1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Prov Gravure	Providence	RI	Gravure	"Lactol"		1
Charleston Rubber Co.	Charleston	SC		Naphtha and Naphthal Spirits	10,000	12
Norton Co. Safety Products Div	Charleston	SC	Fabricated Rubber (glove mfg)		8,500	1
Anchor Continental Inc.	Columbia	SC		Toluene	120,000	12
Carolina Eastman	Columbia	SC	Terephthalic Acid Manufacture	Methyl Bromide	10,000	12,19
				Methyl Acetate		
				p-Xylene		
				Methanol		
				Acetaldehyde		
Hoechst Fibers Inc.	Spartanburg Co.	SC	Chemical Manufacture	Terephthalic Acid-HNO3-Paraxylenegen	9,528	1
Dupont	Davidson Co.	TN	Polyester Production		1,711	1
Dupont	Davidson Co.	TN	Polyester Production		2,978	1
Schrader Automotive Products	Dickson	TN	Degreasing	Trichloroethylene		1
R. R. Donnelley & Sons	Gallatin	TN	Gravure		39,960	1
R. R. Donnelley & Sons	Gallatin	TN	Gravure		17,340	1
R. R. Donnelley & Sons	Gallatin	TN	Rotogravure		175,000	13
R. R. Donnelley & Sons	Gallatin	TN	Gravure	Toluene	78,000	22
Alco Chem Corp	Hamilton Co.	TN	Chemical Manufacture Storage Tanks	DEA DBA		1
Velsicol Chem Corp	Hamilton Co.	TN	Chemical Manufacture (packaging)	Benzoyl Chloride	60	1
Velsicol Chem Corp	Hamilton Co.	TN	Chemical Manufacture (refining)	Benzoyl Chloride		1
Velsicol Chem Corp	Hamilton Co.	TN	Chemical Mfg (tank truck loading)	Benzoyl Chloride		1
Velsicol Chem Corp	Hamilton Co.	TN	Chemical Manufacture (storage)	Benzoyl Chloride		1
Tennessee Eastman Co.	Kingsport	TN	Acetone Production	Acetone	25,080	1
Tennessee Eastman Co.	Kingsport	TN	Chemical Manufacture	Acetone	12,000	1
Tennessee Eastman Co.	Kingsport	TN	Textile Production		423	1
Tennessee Eastman Co.	Kingsport	TN	Chemical Manufacture	Acetone	16,020	1
Tennessee Eastman Co.	Kingsport	TN	Chemical Manufacture		16,500	1

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Tennessee Eastman Co.	Kingsport	TN		Acetone	15,000	12
Tennessee Eastman Co.	Kingsport	TN		Acetaldehyde, Diethylether	5,000	12
Tennessee Eastman Co.	Kingsport	TN		Acetaldehyde	5,000	12
IBM Corp	Austin	TX	Circuit Board Manufacture			8
Texas Instruments Inc.	Austin	TX	Printed Wire Manufacture	Methyl Chloroform, Methyl Chloride	2	8
Dupont	Beaumont	TX	Hypalon Process	Chloroform, Carbon Tetrachloride	146	8
Velsicol Chemical Corp	Beaumont	TX	Benzoic Acid Manufacture			8
Celanese Plastics Co.	Bishop	TX	Nylon Production	1,6-Diaminoloxane/others		8
Brown & Root Inc	Corpus Christi	TX				10
Texas Color Printers Inc.	Dallas	TX		Toluene, Naphtha, Xylene	61,000	17,26
Diamond Shamrock	Deer Park	TX	Chemical Manufacture	Trichloroethylene	0.49	8
Diamond Shamrock	Deer Park	TX	Ethylene Dichloride Manufacture	Acetylene, EDC		9
Empak Inc.	Deer Park	TX	Railcar Cleaning			8
Saltex Polymer Corp	Deer Park	TX	Peroxide-Percarbonate of soda prod			8
Shell Oil Co.	Deer Park	TX	Phenol Production	Cumene, Formaldehyde, Methanol, Acetaldehyde	17,980	18
Allen Bradley Co.	El Paso	TX	Potentiometer Manufacture	Trichloroethylene Methyl chloroform	1.7	8
Allen Bradley Co.	El Paso	TX	Resistor Manufacture	Trichloroethylene		8
Robertshaw Controls Co.	El Paso	TX	Vapor Degreaser	Perchloroethylene		8
Texas Color Printers, Inc.	Farmers Branch	TX	Gravure Printing			8
Texas Color Printers, Inc.	Farmers Branch	TX	Gravure Printing			8
Diamond Shamrock	Fort Worth	TX				10
Tandy Magnetics	Fort Worth	TX	Gravure Coating			8
Dow Chemical	Freeport	TX	Isocyanate Production	Toluene Diisocyanate	10	8
Dow Chemical	Freeport	TX	Epoxy Resin Mfg	Halogenated compounds		8

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Dow Chemical	Freeport	TX	Phenol Production			1,8
Rhone-Poulenc Inc	Freeport	TX	Ethyl Vanillin Prod	Ethylene Dichloride		8
Skintech	Freeport	TX	Polyvinyl Chloride Manufacture	Vinyl chloride		8
Continental Oil	Grapevine	TX				10
Liquid Paper Corp.	Greenville	TX	Typewriter Ribbon, Correction Fluid			8
Armco Steel Corp.	Houston	TX	Coke Plant By-Products	Phenol	100	8
Maxwell House	Houston	TX	Caffeine Extraction		0.8	8
Maxwell House	Houston	TX	Decaffeination			8
Trumbull Asphalt Div. Owens Corning	Houston	TX	Petroleum Dehydration			8
Dominguez and Sapp Enterprises	LaMarque	TX	Tar Recovery	Vinyl chloride and other HCs		8
Continental Can Co.	Longview	TX	Can Manufacture			8
Longview Refining	Longview	TX	Light Oil Truck Loading			8
Western Electric	Mesquite	TX	Circuit Parts Cleaning	Perchloroethylene	5	8
Western Electric	Mesquite	TX		Perchloroethylene	4	8
Western Electric	Mesquite	TX	Backplane Connectors		1	8
Western Electric	Mesquite	TX		Perchloroethylene	5	8
Western Electric	Mesquite	TX	Circuit Parts Cleaning	Perchloroethylene	2.49	8
Western Electric	Mesquite	TX	Soldering			8
Illinois Tool Works Inc.	Mineral Wells	TX	Vapor Degreasing	Trichloroethylene	1.3	8
El Paso Products	Odessa	TX	Adipic Acid Production	Cyclohexane		9
Gulf Oil	Orange	TX				10
Hu Mor Chem Inc	Palacios	TX	Herbicide and Pesticide Mfg	Phosgene, Mercaptans		8
B. F. Goodrich	Pasadena	TX	Chemical Manufacture	Carbon Tetrachloride		8
Diamond Shamrock	Pasadena	TX	Chemical Manufacture			8
FMC	Pasadena	TX	Hydrogen Peroxide Prod			8
Tenneco Chemicals	Pasadena	TX	Polyvinyl Chloride Manufacture	Vinyl Chloride		8,9
Gulf Oil	Port Arthur	TX				10
Texaco	Port Arthur	TX	Petroleum loading/storage			8

(Continued)

TABLE 1 (Continued)

COMPANY	CITY/COUNTY	ST	SOURCE	CHEMICAL	FLOW (CFM)	REF
Kelly AFB (USAF)	San Antonio	TX	Aircraft Repair and Testing	Naphtha, Perchloroethylene		8
Sigmor Pipeline Corp	San Antonio	TX				10
Folger Coffee Co.	Shermon	TX	Coffee Processing			8
Lowry Tank and Terminal Co.	Texas City	TX	Chemical Storage			8
Texas City Refining Inc.	Texas City	TX				10
Union Carbide	Texas City	TX	Organic Acids Production			8
Union Carbide	Texas City	TX	Ethylene Amine Production	Vinyl Chloride, Dichloroethylene		9
Western Zirconium, Inc.	Waco	TX	Zirconium Sponge Separation		3	8
Utex Industries Inc.	Weimar	TX	Rubber packing, gaskets, and seals	Methyl ethyl ketone, toluene	10	8
Exxon Co.	Chesapeake	VA				10
Reynolds Metal Co.	Grottoes	VA		Tetrahydrofuran	16,000	12
Meredith-Burda Inc.	Lynchburg	VA		Toluene	48,500	15,17
Meredith/Burda	Lynchburg	VA	Gravure		2,485	1
Celanese Fibers Co.	Narrows	VA		Acetone	50,000	12
Stauffer Chemical Co.	Richmond	VA			3,000	15
FMC Corporation	Spotsylvania	VA	Film coating		32,200	1
Dupont	Waynesboro	VA	Plastics prod	Acetone		1
Kalama Chemical Co.	Kalama	WA	Benzoic Acid Manufacture	Toluene	6,250	16
Marathon Oil Co.	Milwaukee	WI				10
Phillips Petroleum	Milwaukee	WI				10
Husky Oil Co.	Cheyenne	WY				10

(Continued)

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27. USS Polyester, Colton, CA, plant personnel, September 1979.

28. Larson, W. E., Chevron U.S.A., Inc., letter to D. Barton, September 4, 1979.

29. Cascade Cleaners, Los Angeles, CA, plant personnel, September 1979.

30 Am Vac Chemical Corporation, Los Angeles, CA, plant personnel, Spetember 1979.

31. Factory Apron & Towel Supply, Inc., Los Angeles, CA, plant personnel, September 1979.

32. Stauffer Chemical Co., Richmond (Stege), CA, plant personnel, September 1979.

33. Chase, Emil, Movie Lab, Hollywood, CA, September 1979.

34. Lang, W., General Tire and Rubber Co., telephone conversation with C. S. Parmele, Oct. 5, 1979.

they should be verified because the data were often based on unconfirmed engineering estimates. Since the significant followup required to develop and validate these data could not be done within the budgetary constraints of this project, it was not worthwhile to evaluate any of these data. It was also not worthwhile to compare the results of this survey with the work of other EPA contractors who have assessed the use of adsorption in specific industries such as dry cleaning or metal degreasing.

Several people contacted referred to a master list of control devices which would be able to identify all of the applications of adsorption. If such a listing exists, it was not found by this survey despite numerous attempts to followup these leads. These followup activities always had two results. Either the data source was not as comprehensive as reported or else nobody who knew about the source of data could be located.

Compiling a data base to assess the effectiveness of adsorption does not require the collection of data for <u>all</u> the applications listed in Table 1. Table 1 can be used, however, to set priorities for additional followup activities by identifying the applications for which more data are desired.

APPENDIX A

SUMMARY OF CONTACTS MADE

The following is a summary of the sources surveyed including the names and phone numbers of the people who provided information. This discussion is included to expedite followup activities by taking advantage of the effort that has already been expended to first identify the people within the various agencies who know if the data exist and if so how to access it.

1. Carbon-Adsorption Vendors

Eight equipment and/or carbon suppliers were contacted in a telephone survey and requested to provide information (one vendor, Phillips Pollution Control Systems, could not be located). One vendor, American Ceca, gave some information on eight installations in the initial telephone contact. Two vendors, Vulcan and Hydrotech, provided a partial listing of clients and their locations. Hoyt, Ray-Solv, Oxy-Catalyst, Calgon, and VIC Manufacturing stated they were unable to provide assistance either because of confidentiality problems with disseminating client information or because there was no economic incentive for them to give assistance.

Contacts

American CECA Corp. Solvent Recovery Div., P. Alton (312)986-1515
Vulcan Manufacturing Co., Robert Duhl (513)281-2800
Hydrotech Engineering, Inc., Mac Goble (713)780-4448
Hoyt Manufacturing Corp., D. W. Oakes (617)636-8811
Ray-Solv, Inc., Robert Spencer (201)981-0500
VIC Manufacturing Co., Tom Cannon (612)781-6601
Calgon Corporation, Roger Zanitsch (412)777-8424
Oxy-Catalyst, Robert Kenson (215)692-3500

2. Professional Societies

Two were contacted. The Society of Plastics Industry stated no records were maintained on control devices used by member companies. The Gravure Research Institute referred us to Radian Corp., which provided a report listing rotogravure companies, locations, and whether or not carbon was being used.

Contacts

Society of Plastics Industry, John Lawrence (212)573-9400

The Gravure Research Institute, Harvey George (516)883-6670

3. EPA Regions

Regions III, IV, V, VI, and X were contacted and practically no information was obtained even after as many as six people per region were questioned. One region (VI) did perform a NEDS (National Emissions Data System) data search for Louisiana and Texas, which located only one carbon system.

Contacts:

Region III, William Bellanger (215)597-8188

Region IV, Barry Gilbert (404)881-2864

Region V, Eric Cohen (312)353-2090

Region VI, Tim Matzke (214)767-2541

Region X, referred us to Washington State, Ed Taylor (206)696-2508

4. EPA - Data Analysis System National Air Data Branch, Office of Air Quality Planning and Standards

A search for carbon adsorption control devices listed in NEDS was received. This search identified 128 applications. The failing of NEDS is that many states have an upper emissions limit which must be exceeded before the data are reported to the national NEDS. Therefore, NEDS is only as complete and accurate as the information supplied by the states.

Contact:

Harold Barkau (919)541-5491

5. EPA - Standards Development Branch Emissions Standards and Engineering Division Official Air Quality and Performance Standards, Research Triangle Park, NC

There are data on adsorption applications in their files but not in one central location. This is one source that should be included in any followup activities. Reports on adsorption as a control device in the dry cleaning industry were also provided.

Contact:

Dave Patrick (919)541-5477

6. EPA - Washington, DC

Compliance Data System traces Stationary Sources and Enforcement Actions pertaining to air pollution violations. This is a computerized data system but could not provide any data for this survey because carbon adsorption as a control device is not included in this data bank.

Contact:

Franklin Smith (202)755-0103

7. States

Wisconsin, Michigan, Missouri, Virginia, New Jersey and Pennsylvania had no ready method for performing a search although New Jersey is planning to establish a computerized data base in the near future. West Virginia provided a listing of chemical companies which they said could be contacted individually. Indiana, California, Ohio, and Washington performed manual searches of their files and provided some data. Computerized searches were performed by Connecticut, Illinois, Texas, Minnesota, and New York. Maryland offered transfer of entire state emissions file to our tape, but we did not follow up because of the large amount of effort required. The contacts made with the various states are summarized in Table A-1.

The biggest difficulty with surveying the states is, first of all, locating the section that might have files describing control devices (compliance, enforcement, permits, etc). The second problem is validity of the data. For example, permit data generally are based on engineering estimates. Also, permit files may represent facilities which were never completed. Illinois suggested the data from users and installations should be individually validated prior to use. Validation of data from other sources would also be appropriate. There was insufficient time for such a validation program.

8. Miscellaneous

Information that had been compiled for Hydroscience's contract with Emission Standards and Engineering Division, Office of Air Quality Planning and Standards, US EPA, Research Triangle Park, NC (Contract No. 68-02-2577), was reviewed. This included Product Reports, Trip Reports, and Emission Inventory Questionnaires for Louisiana and Texas. Only a small percentage of the applications in Table 1 were identified by this review.

A search of the open literature via the Lockheed Dialog System revealed that very little information has been published for full-scale applications of vapor-phase adsorption.